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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,964	02/09/2004	Thomas A. Trabold	8540G-000148	5570

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HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 828
BLOOMFIELD HILLS, MI 48303

EXAMINER	
ENIN-OKUT, EDU E	
ART UNIT	PAPER NUMBER
1795	
MAIL DATE	DELIVERY MODE
12/24/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/774,964	TRABOLD ET AL.	
	Examiner	Art Unit	
	Edu E. Enin-Okut	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 October 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4* is/are pending in the application.

4a) Of the above claim(s) *2-3,5-16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FUEL CELL FLOODING DETECTION

Detailed Action

1. The request for request for reconsideration filed on October 14, 2009 was received. Claims 1 and 4 are pending.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102/103

3. The rejection of claims 1 and 4 under 35 U.S.C. 102(b) as being anticipated by DiPierno Bosco et al. (US 6,103,409) is maintained. The rejection is repeated below for convenience.

The instant claims are to a fuel cell stack comprising:

- a fuel cell having an inlet, a flow field in fluid communication with said inlet and an outlet in fluid communication with said flow field;
- a vaporized water source in fluid communication with said inlet;
- a differential pressure transducer repeatedly measuring a differential pressure across said flow field and generating a set of differential pressure signals; and
- a controller in communication with said differential pressure transducer, said controller having executable logic for determining a root-mean-square value from said set of differential pressure signals and control circuitry for controlling said vaporized water source in response to the root-mean-square value.

The instant claims are to a product, a fuel cell stack and not to a process of operating a fuel cell stack. The claims include intended use limitations and process steps. For example, the limitation, "for determining a root-mean-square value from said set of differential pressure signals" is an intended use of the controller. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed

invention from the prior art. If the prior art structure is capable of performing the intended use; then it meets the claim.

The limitation, "a differential pressure transducer repeatedly measuring a differential pressure across said flow field and generating a set of differential pressure signals" is a process step for using the transducer. The use of the claimed controller and the steps performed by the claimed controller provide structure to the invention by showing that these structural features are connected, but do not limit the product claim with respect to the use. The controller only need be capable of performing the steps to read upon the claim.

DiPierno Bosco et al. (US 6,103,409) teaches a fuel cell stack comprising a fuel cell having an inlet, a flow field in fluid communication with said inlet and an outlet in fluid communication with said flow field (see figure 1 and col. 3, line 65 to col. 5, line 37); a vaporized water source in fluid communication with said inlet (col. 1, lines 48-65; col. 2, lines 14-end); a differential pressure transducer for measuring a differential pressure across said flow field and generating a set of differential pressure signals (paragraph bridging cols. 4-5); and a controller in communication with said differential pressure transducer, said controller having executable logic for determining a differential pressure fluctuation parameter from said set of differential pressure signals and control circuitry for controlling said vaporized water source in response to said differential pressure fluctuation parameter (col. 5, line 1 to col. 6, line 25.) Computers, microprocessors and logic are disclosed. The microprocessor includes a common digital computer with ROM, RAM, EPROM, instructions, algorithms, data manipulation and may be fitted with the Microsoft Windows systems (col. 5, lines 35+.) It is noted that Windows includes Excel spreadsheets which have executable logic for determining a root-mean-square value. The microprocessor may include a specific program for carrying out the functions of the processor. The controller is capable of determining a differential pressure fluctuation parameter as a representative statistical value as a representative statistical value as a root-mean-square value based on standard mathematical logic inherent

to a microprocessor. The controller has executable logic and control circuitry to control the vaporized water source. Thus, the claims are anticipated.

4. The rejection of claims 1 and 4 under 35 U.S.C. 103(a) as being unpatentable over DiPierno Bosco et al. (US 6,103,409,) as described above in view of Eryurek et al. (US 6,539,267) is maintained. The rejection is repeated below for convenience.

The teachings of DiPierno Bosco et al. (US 6,103,409) have been made of record in the previous section. DiPierno Bosco et al. (US 6,103,409) teaches a fuel cell stack comprising a vaporized water source, a differential pressure transducer and a controller having executable logic and control circuitry for controlling said vaporized water source in response to said differential pressure fluctuation parameter. DiPierno Bosco et al. (US 6,103,409) does not teach that the controller determines a differential pressure fluctuation parameter as a representative statistical value as a root-mean- square value from said set of differential pressure signals and controlling said vaporized water source in response to the root-mean-square value.

Eryurek et al. (US 6,539,267) teaches a process system for determining a statistical parameter related to a process which can be used in statistical process control systems (abstract, claim 1, col. 3, line 1 to col. 4, line 67; col. 8, lines 1-55.) The device includes a sensor providing output related to the process including a pressure sensor (claims 6-7), input and output circuitry, and computing circuitry (claims 1-6.) The statistical parameter may be the root-mean-square of the input (claim 4.) The controller is used to process variables that are typically used in a control process (col. 2, lines 30-end.)

If the claims are not considered anticipated by DiPierno Bosco et al. (US 6,103,409), as described above, then it would have been obvious to one of ordinary skill in the art at the time of the invention for the controller to determine the differential pressure fluctuation parameter as a representative statistical value as a root-mean- square value from said set of differential pressure signals as taught by Eryurek and

control said vaporized water source as taught by DiPierno Bosco in response to the root-mean-square value. Such a controller will allow for the accurate control of the device (col. 4, lines 1-67), and have increased sensitivity and control monitoring deficiencies such as drift, bias and noise (col. 6, lines 10-60.)

The invention is obvious since the controller logic is straightforward. There is nothing unexpected in the claimed fuel stack that is not obvious in view of well-known fundamentals of computers and controllers and the basic, ubiquitous mathematical technique of calculating root-mean-squares from a set of value. Further, the prior art fuel cell includes a computer including a controller which controls the fuel cell using logic based on pressure fluctuations. Although the DiPierno Bosco reference does not include using a root-mean-square value, the "basic mathematical technique" of calculating a root-mean-square is a simple statistical calculation well-known to one of skill in the art. As noted in applicant's arguments, one or ordinary skill in the art has the ability to perform basic mathematical techniques that would be known to any person skilled in the art.

Response to Arguments

5. Applicants' arguments filed October 14, 2009 have been fully considered but they are not persuasive.

6. As to applicants' arguments the use of a root-mean-square value and use of the Excel program (see p. 2-4 of its remarks), first, it is again noted that applicant stated on p. 4-5 of its response to a Final Office Action filed on May 4, 2009 that "... The "basic mathematical technique" of calculating a root-mean-square is a simple statistical calculation well-known to one of skill in the art. See, Electronics Engineers' Handbook, 3rd Edition, Donald G. Fink, et al. at 3-20 (1989)." Thus, one of ordinary skill in the art would readily appreciate how to utilize this "basic mathematical technique", why a technique such as this one would be employed, and that a computer with microprocessor is capable of performing such

calculations. Further, it should also be noted the Eryurek reference teaches that a controller, employing statistical parameter may be the root-mean-square of the input, will allow for the accurate control of the device and have increased sensitivity and control monitoring deficiencies such as drift, bias and noise, as discussed in the rejection of claim 1 above.

Second, with respect to the Microsoft Windows operating system and its use of the Microsoft Excel program, it should also be noted that Microsoft Windows has over 90% of the market share of the computer operating systems (see "Operating System Market Share" by Market Share by Net Applications at www.marketshare.hitslink.com); and, about 80% of enterprises use Microsoft Office (see "Forrester: Microsoft Office in No Danger From Competitors" on PCWorld.com). Thus, it is noted that the vast majority of computers with a Windows operating system use Microsoft Office (which includes Microsoft Excel); and, one of ordinary skill in the art would readily appreciate the use of programs conveniently tailored to smoothly interface with its computer's operating system.

7. As to applicants' assertions that the DiPierno Bosco and Eryurek references utilize an "a priori" collection of data (see p. 2 and 6 of its remarks), it is noted that applicants' claim 1 makes no recitations with respect to time in association with the "set of differential pressure signals". Thus, applicants' arguments with respects are unpersuasive.

8. As to applicants' argument with respect to unexpected results (see p. 5 of its remarks), it should be noted that the Eryurek reference teaches the controller processes data and responds in a dynamic fashion (see Eryurek, col. 5, lines 43-53). One of ordinary skill in the art would readily appreciate that use of a controller, employing statistical parameter may be the root-mean-square of the input, would impart the above-described characteristics to the fuel cell stack of DiPierno Bosco, as modified by Eryurek, discussed in the rejection of claim 1.

Conclusion

9. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Edlund et al. (US 2004/0081868) teaches a fuel cell system with a servicing system adapted to monitor and control the operation of the fuel cell system (Abstract; para. 34-36, 44).

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Edu E. Enin-Okut** whose telephone number is **571-270-3075**. The examiner can normally be reached on Monday to Thursday, 7 a.m. - 3 p.m. (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edu E. Enin-Okut/
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795